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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,381	01/15/2004	Stephen Wayne Tefft	121657-3/11944 (21635-009	5431

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EXAMINER	
BAREFORD, KATHERINE A	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 10/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/758,381	TEFFT ET AL.	
	Examiner	Art Unit	
	Katherine A. Bareford	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers Claims 1-11 are canceled

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The preliminary amendment filed with the application has been received and entered. It is noted that claims 1-11 are canceled.

Specification

2. The disclosure is objected to because of the following informalities: in paragraph [00005] provided by the preliminary amendment, the serial number of the issued patent should be provided.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moore al (US 2003/0161946) in view of Knight, et al "HVOF Sprayed 80/20 NiCr Coatings--Process Influence Trends" (hereinafter Knight Article).

Moore teaches a method for forming a deposit on a deposition substrate. Paragraphs [0018]—[0019]. A deposition gun is provided. Paragraphs [0019]—[0020]. The gun can be an HVOF (high velocity oxy fuel) spray gun. Paragraphs [0019]—[0020]. The gun can be provided with a flowing coolant. Paragraph [0025]. Moore teaches to control the flow rate of gases to the spray gun (which would include fuel gas and oxidizer gas). Paragraph [0033]. The flow rate of the powder to the spray gun is also controlled. Paragraph [0033]. The flow rate of the coolant flow is also controlled, thus ~~measuring~~ controlling the cooling capacity of the coolant flow. Paragraph [0033]. Moore further teaches to monitor the coating process using sensors to adjust the operation to stay within selected parameters (set point) in a feedback control system. See paragraphs [0033]—[0034].

Claim 14: the coolant flow rate is controlled. Paragraph [0033].

Claim 16: monitored features can be used to provide feedback to an operator for allowing the operator to make adjustments. Paragraph [0034].

Claim 17: monitored features can be used to automatically adjust the operation to ~~stay~~ stay within desired parameters. Paragraph [0034].

Moore teaches all the features of these claims except (1) the specific features that are measured and used for feedback control (claim 12-14), (2) the features of the HVOF spray gun (claim 15 and 17) and (3) the instrumentation array (claim 16).

Knight Article teaches the use and testing of an HVOF apparatus. See page 159. HVOF processes are taught to provide a deposition gun that burns a mixture of fuel gas and an oxidizer (oxygen) to form a deposition gas flow, mix a powder into the deposition gas flow to form a deposition mixture flow and project the deposition mixture flow therefrom. See page 159. The mixture of fuel and oxidizer is burned in a combustion chamber to provide a pressured deposition gas flow. Page 159. The gas flow is mixed with the pressured gas flow in a mixing area. See page 159. A deposition flow director receives the deposition mixture and directs towards the substrate (the constricting nozzle). Page 159. The gun is taught as being provided with a flowing coolant, which would pas through a cooling structure. Page 159 (air or water). Knight Article teaches that important variables for coating include fuel and oxygen ratio, pressure and total flow; the feed rate (flow rate) of the powder; and the coolant medium features, including temperature and flow rate. See page 159.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Moore to specifically monitor and control the flow rate of the fuel, oxidizer, and powder, and the flow rate and temperature of the coolant flow as suggested by Knight Article in order to provide an optimum final coating product, because Moore teaches coating using an HVOF spray gun system and to monitor various parameters of the spray system and provide feedback control to keep these parameters at optimum positioning, and Knight Article teaches that desirable features to control and keep at a specific setting include the flow rate of the fuel, oxidizer, and powder, and the flow rate and temperature of the coolant flow when coating with an HVOF spray gun. Furthermore, it would further have been obvious to modify the references to

provide an instrumentation array of the measurements of these features in order to provide a desirable adjustment of the features, because Moore teaches that the controller for monitoring the coating process can provide feedback to an operator for making adjustments, which would indicate that some type of instrumentation array would be needed to show results and allow adjusting. Furthermore, it would further have been obvious to modify the references to provide an automatically controllable fuel source, oxidizer source, powder and coolant source, in order to provide a desirable adjustment of the features, because Moore teaches that the controller for monitoring the coating process can be used to provide automatic adjustments, which would indicate that the materials to be supplied would need a system that allows automatic control of the materials to be provided.

6. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moore in view of Knight Article as applied to claims 12-17 above, and further in view of Nakagawa et al (US 5958522).

Moore in view of Knight Article teaches all the features of these claims except the fuel to oxidizer ratio of 2.2-2.6. Knight Article does teach that for the HVOF system the fuel gas can be hydrogen and the oxidizer can be oxygen. Page 159.

However, Nakagawa teaches that when performing an high speed flame spraying with the fuel gas as hydrogen and the oxidizer as oxygen, a desirable ratio of hydrogen to oxygen is 2.0:1 to 2.6:1. Column 1, lines 5-15 and column 6, line 55 through column 7, line 5.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Moore in view of Knight Article to use a hydrogen:oxygen ratio as suggested by Nakagawa in order to provide an optimum final coating product, because Moore in view of Knight Article teaches coating using an HVOF spray gun system and that the fuel can be hydrogen and the oxidizer can be oxygen, and Nakagawa teaches when performing high speed flame spraying with a hydrogen fuel and oxygen oxidizer, a desirable hydrogen:fuel ratio can be 2.6:1, for example.

7. Claims 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knight, et al "HVOF Sprayed 80/20 NiCr Coating--Process Influence Trends" (hereinafter Knight Article) in view of Packer et al (US 4613259).

Knight Article teaches the use and testing of an HVOF apparatus to form a deposit on a surface. See page 159. HVOF processes are taught to provide a deposition gun that burns a mixture of fuel gas and an oxidizer (oxygen) to form a deposition gas flow, mix a powder into the deposition gas flow to form a deposition mixture flow and project the deposition mixture flow therefrom. See page 159. The mixture of fuel and oxidizer is burned in a combustion chamber to provide a pressured deposition gas flow. Page 159. The gas flow is mixed with the pressured gas flow in a mixing area. See page 159. A deposition flow director receives the deposition mixture and directs towards the substrate (the constricting nozzle). Page 159. The gun is taught as being provided with a flowing coolant, which would pas through a cooling structure. Page 159 (air or water). Knight Article teaches that important variables for coating include fuel and oxygen

ratio, pressure and total flow; the feed rate (flow rate) of the powder; and the coolant medium features, including temperature and flow rate. See page 159.

Knight article teaches all the features of these claims except (1) the set point controlling of the parameters, (2) the instrumentation array (claim 16) and (7) the automatically adjustable sources (claim 17).

However, Packer indicates the desire, when using a thermal spray gun, to monitor and control various process parameters that have an effect on the properties of the applied coatings. Column 1, lines 5-15, column 2, lines 55-65 and column 3, line 65 through column 4, line 10. These measurements can be sent to a computer to signal to modify the system to achieve a desired result through feedback. Column 5, line 40 through column 6, line 20.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Knight Article to specifically monitor and control the flow rate of the fuel, oxidizer, and powder, and the flow rate and temperature of the coolant flow as suggested by Packer in order to provide an optimum final coating product, because Knight Article teaches coating using an HVOF spray gun system and that desirable features to control and keep at a specific setting include the flow rate of the fuel, oxidizer, and powder, and the flow rate and temperature of the coolant flow when coating with an HVOF spray gun, and Packer teaches that it is desirable to use a feedback type system to control parameters that have a result on the final coating when thermal spraying. Furthermore, it would further have been obvious to modify the references to provide an instrumentation array of the measurements of these features in order to provide a desirable adjustment of the features, because Packer teaches that the controller for

monitoring the coating process can provide feedback for making adjustments, which would indicate that some type of instrumentation array would be needed to show results and allow adjusting. Furthermore, it would further have been obvious to modify the references to provide an automatically controllable fuel source, oxidizer source, powder and coolant source, in order to provide a desirable adjustment of the features, because Packer teaches that the controller for monitoring the coating process can be used to provide adjustments, and it is well known to make adjustments either by hand or automatically, and for automatic adjustments the materials to be supplied would need a system that allows automatic control of the materials to be provided.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Knight Article in view of Packer as applied to claims 12-17 above, and further in view of Nakagawa et al (US 5958522).

Knight Article in view of Packer teaches all the features of these claims except the fuel to oxidizer ratio of 2.2-2.6. Knight Article does teach that for the HVOF system the fuel gas can be hydrogen and the oxidizer can be oxygen. Page 159.

However, Nakagawa teaches that when performing an high speed flame spraying with the fuel gas as hydrogen and the oxidizer as oxygen, a desirable ratio of hydrogen to oxygen is 2.0:1 to 2.6:1. Column 1, lines 5-15 and column 6, line 55 through column 7, line 5.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Knight Article in view of Packer to use a hydrogen:oxygen ratio as suggested by Nakagawa in order to provide an optimum final coating product, because Knight Article in view

of Packer teaches coating using an HVOF spray gun system and that the fuel can be hydrogen and the oxidizer can be oxygen, and Nakagawa teaches when performing high speed flame spraying with a hydrogen fuel and oxygen oxidizer, a desirable hydrogen:fuel ratio can be 2.6:1, for example.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:30-4:00) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (571) 272-1415. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KATHERINE BAREFORD
PRIMARY EXAMINER